NJ-series NJ Robotics CPU Units

NJ501-4□□□

Machine Automation Controller
NJ series

New controller that covers functions and high-speed processing required for machine control and safety, reliability and maintainability that are the features of industrial controllers provides parallel link robot control function.
In addition to robot control, general motion control with up to 64 axes can be also performed.

NJ501-4□□□

Features

- Special instructions for kinematics of parallel link robots
- Faster and more accurate machine control
  - One machine control to ensure accurate synchronization between conveyor and robot
  - High-speed output of data from vision sensors and other sensors for robot control
- Faster machine development
  - One language used for programming, from sequence control to robot control
  - One software, Sysmac Studio, to start devices including vision sensors and robots
  - Programming for motion and robot control using instructions conforming to IEC 61131-3 standards
- Smaller machine footprint
  - One Controller to control up to 8✻ parallel rink robots
- One network, EtherCAT, to connect all machine network devices: vision sensors, servo drives and field devices.

✻ The number of controlled robots varies according to the number of axes used for the system.

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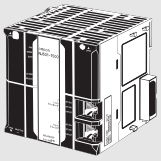
Ordering Information

International Standards

- The standards are abbreviated as follows: U: UL, U1: UL(Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, CE: EC Directives, C-Tick: C-Tick mark and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

Use for robot systems
Contact your OMRON representive for further details and conditions for robot systems.

NJ501 CPU Units

Product Name	Specifications				Number of controlled robots	Database Connection function	Current consumption (A)		Model	Standards
	I/O capacity / maximum number of configuration Units (Expansion Racks)	Program capacity	Memory capacity for variables	Number of motion axes			5 VDC	24 VDC		
NJ501 CPU Units 	2,560 points / 40 Units (3 Expansion Racks)	20 MB	2 MB: Retained during power interruption 4 MB: Not retained during power interruption	64	8 max. *	No	1.90	–	NJ501-4500	UC1, N, L, CE, C-Tick, KC
				32					NJ501-4400	
				16					NJ501-4300	
				16	1				NJ501-4310	
				16	8 max. *	Yes			NJ501-4320	

✻ The number of controlled robots varies according to the number of axes used for the system.

Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually. Each model of licenses does not include any DVD.
The license number for a robot is required to use this CPU Unit. Please inquire of the salesman of our company about details.

Product name	Specifications	Number of licenses	Media	Model	Standards
Sysmac Studio Standard Edition Ver.1.□□	The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX Series, EtherCat Slave, and the HMI. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version)/Windows Vista(32-bit version)/Windows 7(32-bit/64-bit version)/Windows 8(32-bit/64-bit version)/Windows 8.1(32-bit/64-bit version)	– (Media only)	DVD	SYSMAC-SE200D	–
	The Sysmac Studio Standard Edition DVD includes Support Software to set up EtherNet/IP Units, DeviceNet slaves, Serial Communications Units, and Support Software for creating screens on HMIs (CX-Designer). For details, refer to the Sysmac Integrated Catalogue (P072).	1 license *1	–	SYSMAC-SE201L	–
Sysmac Studio Robot Additional Option *2	Sysmac Studio Robot Additional Option is a license to enable the Vision & Robot integrated simulation.	1 license	–	SYSMAC-RA401L	–

Note: The license number for a robot is required to use this CPU Unit with the Sysmac Studio version 1.13 or lower. Please contact your OMRON sales representative for details.
The Sysmac Studio version 1.14 or higher does not require the license number for a robot.
✻**1.** Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).
✻**2.** Sysmac Studio Standard Edition is required to use this option.

Recommended EtherCAT and EtherNet/IP Communications Cables

For the Recommended EtherCAT and EtherNet/IP Communications Cables, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

Accessories

The following accessories come with the CPU Unit.

Item	Specification
Battery	CJ1W-BAT01
End Cover	CJ1W-TER01 (necessary to be connected to the right end of the CPU Rack.)
End Plate	PFP-M (2 pcs)

General Specification

For the common specifications of the NJ-series NJ501, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

Performance Specifications

- For robot control, use the G5 series AC Servo Drive with built-in EtherCAT communications, absolute encoder, and brake.
- The EtherCAT communications cycle for robot control is 1 ms or less.

Furthermore, for the common specifications of the NJ-series NJ501, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

Refer to the specifications of the NJ501-□5□0 for those of the NJ501-45□□, the NJ501-□4□0 for the NJ501-44□□, and the NJ501-□3□0 for the NJ501-43□□.

Function Specifications

For the common specifications of the NJ-series NJ501, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

Functions Supported by NJ501-4□□□

Besides functions of the NJ501-1□00, functions supported by the NJ501-4□□□ are as follows.

Item				NJ501-				
				4500	4400	4300	4310	4320
Robot control functions	Axes groups	Multi-axes coordinated control	Conveyer tracking	The robot is moved in synchronization with the conveyor during the conveyor tracking operation.				
		Auxiliary functions for multi-axes coordinated control	Kinematics Setting	Set parameters for robot operation, such as arm length of Delta3 robot.				
	Auxiliary functions	Monitoring functions	Work space function	Set the coordinate values for workspace check and check the workspace during operation.				

DB Connection Functions Supported by NJ501-4320

For the DB connection functoins supported by the NJ501-4320, refer to to the Machine Automation Controller NJ/NX-Series Datasheet.

Unit Versions and Robot Versions

Units	Models	Unit Version	Robot Version
NJ501 CPU Units	NJ501-4□□□	Unit version 1.02 or later	Robot version 1.00 or later

Unit Versions, Robot Versions and Programming Devices

The following table gives the relationship between unit versions of CPU Units and the corresponding Sysmac Studio versions.

Unit version of CPU Unit	Robot version of CPU Unit	Corresponding version of Sysmac Studio
1.10	1.02	1.14
1.09	1.02	1.13 1.12 1.11 1.10
1.08	1.02	
	1.01	
1.07	1.00	1.08
1.06		1.07
1.05		1.06
1.04		1.05
1.03		1.04
1.02		

Functions That Were Added or Changed for Each Unit Version and Sysmac Studio version

For the common specifications of the NJ-series NJ501, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

External Interface

For the External Interface, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

Dimensions

For the Dimensions, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

Related Manuals

The following manuals are related to the DB Connection Service. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
NJ-series NJ Robotics CPU Units User's Manual	W539	NJ501-4□□□	Using the robot control with NJ-series Controllers.	Describes the robot control. Use this manual together with the NJ/NX-series CPU Unit Motion Control User's Manual (Cat. No. W507) and the NJ/NX-series Motion Control Instructions Reference Manual (Cat. No. W508).
NJ-series Database Connection CPU Units User's Manual	W527	NJ501-1□20 NJ101-1□20 NJ101-9□20	Learning about the functions and application procedures of the NJ-series DB Connection function.	Describes the functions and application procedures of the NJ-series DB Connection function.
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC -SE2□□□	Learning about the operating procedures and functions of Sysmac Studio.	Describes the operating procedures of Sysmac Studio.
Vision Sensor FH Series Conveyor Tracking Application Programming Guide	Z368	SYSMAC-SE20□□ SYSMAC-RA401L NJ501-4□□□ R88D-KN□-ECT FH-1□□□ FH-3□□□	To learn the setup procedure of the wizard style calibration for cameras, robots, or conveyors.	Describes how to configure and operate Conveyor Tracking Calibration Wizard on Sysmac Studio on FH Sensor Controllers.
Vision Sensor FH Series Operation Manual Sysmac Studio Calibration Plate Print Tool	Z369		To learn the setup procedure for printing the Pattern on a Calibration Plate used for calibration for cameras and robots on Sysmac Studio.	Describes how to configure and operate Calibration Plate Print Tool on Sysmac Studio on FH Sensor Controllers.
Vision Sensor FH Series Operation Manual Sysmac Studio Conveyor Tracking Calibration Wizard Tool	Z370		To learn the setting procedure of sample macros for conveyor tracking.	Describes the setting procedure of sample macros used for applications of conveyor tracking on FH Sensor Controllers.
Vision Sensor FH Series Operation Manual Sysmac Studio Conveyor Panorama Display Tool	Z371		To learn the setup procedure of panorama display for image capture of targets on conveyors.	Describes how to configure and operate the Conveyor Panorama Dis-play tool on Sysmac Studio on FH Sensor Con-trollers.

For the Related Manuals about the common specifications of the NJ-series NJ501, refer to the Machine Automation Controller NJ/NX-Series Datasheet.

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